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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/593,271	09/18/2006	Hidetoshi Saitoh	4991-0114PUS1	8682
2292 7590 01/14/2009 BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747				
EXAMINER HOBAN, MATTHEWE				
ART UNIT		PAPER NUMBER		
1793				
NOTIFICATION DATE		DELIVERY MODE		
01/14/2009		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

### Office Action Summary

**Application No.**

10/593,271

**Applicant(s)**

SAITOH ET AL.

**Examiner**

Matthew E. Hoban

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**Period for Reply** -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 October 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 11-13, 16-19 and 22-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 11-13, 16-19 and 22-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 11-13, 16-19 and 22-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. Where applicant acts as his or her own lexicographer to specifically define a term of a claim contrary to its ordinary meaning, the written description must clearly redefine the claim term and set forth the uncommon definition so as to put one reasonably skilled in the art on notice that the applicant intended to so redefine that claim term. *Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357, 52 USPQ2d 1029, 1033 (Fed. Cir. 1999). The term "blue light" in claim 11 is used by the claim to include light having a wavelength of 410 nm, while the accepted range of blue light is typically from 450-490 nm. The peak wavelength of the claimed phosphor would be regarded as being in the deep violet region of the spectrum bordering on the ultraviolet range. The term is indefinite because the specification does not clearly redefine the term.

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

3. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 11-13 and 24 rejected under 35 U.S.C. 103(a) as being unpatentable over Nagahama in 7,105,857 in view of Wang in his publication entitled "Concentration quenching of Eu<sup>2+</sup> in SrO-Al<sub>2</sub>O<sub>3</sub> phosphor."

Nagahama teaches an LED in detail including all relevant construction steps and components such as the excitation source and the relevant phosphors. Useful phosphor compositions are noted in Column 24 under the subtitle "Types of Phosphor." Included in this list under green-emitting phosphors is  $\text{Sr}_7\text{Al}_{12}\text{O}_{25}:\text{Eu}$ . This is the same host composition and doping component as is instantly claimed. Although Nagahama discloses this phosphor as a green phosphor, this designation is only applicable when excitation is by the nitride type semiconductors listed previously in the teachings of Nagahama. These sources typically have a wavelength around 380 nm as stated in the teachings. However, under more intense light, the phosphor  $\text{Sr}_7\text{Al}_{12}\text{O}_{25}:\text{Eu}$  would emit around 410 nm as the composition taught by Nagahama is the same as that of the claims. Phosphors of the same composition must necessarily have the same properties. As the same composition cannot have two mutually exclusive sets of properties. Furthermore, one of ordinary skill in the art knows that the emission peaks of a phosphor are dependant upon excitation wavelength and the peak emission wavelength and the overall color of emission can change based on excitation wavelength.

Nagahama is silent as to the doping concentration of his strontium aluminate phosphor.

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However, Wang teaches that strontium aluminates have quenching limits as far as divalent Eu is concerned. In the case of Wang's research, this quenching limit. It would therefore, be obvious to one of ordinary skill in the art to perform similar experiments to determine the quenching limit of Nagahama's phosphor as guided by the teachings of Wang. This is routine optimization within the phosphor arts, which is well known by those of ordinary skill. Thus although Nagahama is silent as to Eu concentration in his phosphor, it would be obvious to determine the quenching limit of the phosphor using normal laboratory procedures.

4. Claims 16 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagahama in view of Wang as applied to claim 11 above, and further in view of Xu in his publication entitled "Synthesis of  $\text{SrAl}_2\text{O}_4$  and  $\text{SrAl}_2\text{O}_9$  via ethylenediaminetetracetic acid precursor".

Please see the previous 103 to learn the breadth of the teachings of Nagahama and Wang.

Nagahama in view of Wang is silent as to its production process.

However, Xu teaches that strontium aluminates, which he reflects are used in long-duration photoluminescence materials can be produced

through the EDTA method. In his method, which can be found in the Experimental Procedures section, the precursors are mixed in an ethylene glycol, EDTA solution, where they are complexed with the EDTA, which is an aminocarboxylic acid-based chelating agent. After a solution is created, it is then charred and calcined at a temperature between 700 and 1400C. Xu then goes into further detail about the calcination process, where it is stated that calcining at higher temperatures, helps in crystallization and thus sharpens the Strontium-aluminum XRD peak. Xu also states that calcining in a reducing atmosphere further strengthens the crystalline peak. Therefore the process of Xu includes: 1) a step of producing a solution of organic metal chelate complexes including Sr and Al

- 2) pre-firing or charring of the solution
- 3) firing the powder to produce an oxide, where the firing can occur at 1400C
- 4) using a reducing atmosphere in the firing process
- 5) mechanical grinding

Although, as it was stated previously, Xu teaches the creation of the metal oxide host which is strontium and aluminum, and thus does not include the dopant of Eu, although he recognizes that this is the main use of such a host oxide. Wang teaches the use of Europium, which under the method of Xu would also be chelated if it was included in the precursor solution. Furthermore, altering the stoichiometry of the composition is well within

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the abilities of one of ordinary skill in the art. Thus the method of Xu is seen as highly applicable in the production of the phosphor of Nagahama in view of Wang.

5. Claims 17-19 and 21 rejected under 35 U.S.C. 103(a) as being unpatentable over Nagahama in view of Wang and further in view of Xu as applied to claim 16 above, and further in view of Douy in his publication entitled Crystallization of spray-dried amorphous precursors in SrO-Al<sub>2</sub>O<sub>3</sub> system: a DSC study.

Please see the previous 103 to learn the breadth of the teachings of Nagahama, Wang and Xu.

The aforementioned references do not teach a spray drying step, where instead a pre-firing step is used and a subsequent mechanical grinding after processing.

However, Douy also teaches a method of forming a strontium aluminate, where a spray drying step is used in place of the pre-firing step (charring step) of Xu. The use of spray drying in place of this charring step would be advantageous, since spray drying creates particles, which reduces the amount of steps needed for the process of Xu. The spray drying technique makes the mechanical drying step unnecessary and also



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produces the same amorphous structure as the charring of the solution as in Xu (See Section 2 and 3.1-3.2). Thus one of ordinary skill in the art would find that these two steps are interchangeable. Though the solution of Douy uses nitrates, where Xu uses EDTA, the teachings of Douy are still relevant to Xu in that nitrates and EDTA perform the same purpose of solutionizing the metal ions. In sum one would be motivated to combine these references to produce a process with fewer steps.

6. Claims 22 and 23 rejected under 35 U.S.C. 103(a) as being unpatentable over Nagahama in view of Wang and further in view of Xu and Douy as applied to claims 17 above, and further in view of Ono in 2001/0054708.

The aforementioned references teach a strontium aluminate

The above combination of references does not teach the use of a hydrogen, argon reducing atmosphere during sintering, instead using a carbonaceous one.

However, Ono teaches the use of a reducing atmosphere composed of 2 vol% hydrogen and 98 vol% argon. Therefore, reducing atmospheres of this composition are known. Furthermore, one of ordinary skill would find that the replacement of reducing gases, in this case, the carbonaceous one of Wang for the hydrogen-argon gas of Ono would be obvious. This

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two reducing gases are equivalent to one another and the replacement of one for the other is an obvious alteration producing no unexpected results (See Example 2).

### ***Response to Arguments***

7. Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection. Wang although still found to be useful art is now used to teach a method by which to determine proper Eu doping concentrations. It was previously used to reject the claims under a 102 basis, but is no longer found relevant on that basis. It is still pertinent within the context that it is used, however.

8. Applicants argue that Xu does not teach the process of creating the claimed composition. Xu teaches that a temperature between 700 and 1400 C are necessary to obtain crystalline strontium aluminates. In all scenarios Xu shows better results as higher sintering temperatures. Thus it would be obvious to tend to the upper end of this range naturally. Thus Xu teaches a range obviating the range of "about 1400".

### ***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.**

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See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew E. Hoban whose telephone number is (571) 270-3585. The examiner can normally be reached on Monday - Friday from 7:30 AM to 5 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on (571) 272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J.A. LORENZO/  
Supervisory Patent Examiner, Art Unit 1793

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